U. S. Steel Corporation
Minnesota Ore Operations
P.O. Box 417
Mt. Iron, MN 55768

April 25, 2015

Mr. John Thomas
Pollution Control Specialist Senior
Compliance and Enforcement Section, Industrial Division
Minnesota Pollution Control Agency (MPCA)
525 Lake Avenue South, Suite 400
Duluth, MN 55802

RE: Minntac Tailings Basin Groundwater Sulfate Reduction Plan
Hydraulic Modeling / Microcosm Study

Dear Mr. Thomas:

Pursuant to the January 2014 revision of the Minntac Tailings Basin Groundwater Sulfate Reduction Plan (GWSRP), U. S. Steel is submitting this letter to inform MPCA of the status of the hydraulic modeling / microcosm study designed to investigate and evaluate the permeable reactive barrier (PRB) alternative.

As indicated in an April 25, 2014 letter to you regarding Selection of Alternatives for Further Investigation related to the GWSRP, U. S. Steel has chosen to evaluate implementation of a PRB that utilizes zero valent iron (ZVI) or addition of organic substrates, in combination with the existing seep collection and return system, as a means to achieve compliance with groundwater standards at its property boundary near MW12 (focus area).

A microcosm study was initiated in order to assess the potential for in-situ reduction of sulfate. Groundwater from the site was used to evaluate the relative efficacy of various combinations of reducing agents (ZVI, EHC®) and carbon substrate for potential use in an expanded bench-scale and/or pilot-scale study. Each reagent combination was added to separate 1L bottles prepared in duplicate to be sampled and analyzed in parallel. The combinations of reagents used in the microcosm study are as follows:

- 20% ZVI, sterilized (control group)
- 20% ZVI
- 20% ZVI + lactate
- EHC® + lactate
- 20% ZVI + emulsified oil + lactate
- 20% ZVI + lactate (~6 °C)
- EHC® + lactate (~6 °C)
- 20% ZVI + emulsified oil + lactate (~6 °C)

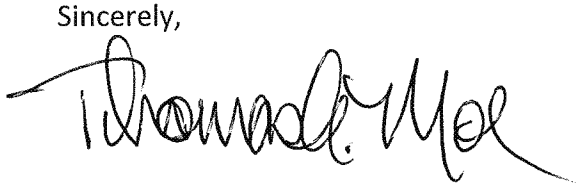
Analytical parameters (pH, oxidation reduction potential, dissolved oxygen, conductivity), and sulfate were analyzed twice per week from one of each pair of bottles, and once every two weeks from the duplicate bottle.

Initial results from the study indicate that reducing conditions are being established and that conditions are enhanced for sulfate reduction in all experimental setups. Once all data from the microcosm study has been received, it will be fully analyzed and used in the determination of a PRB as a viable alternative to achieve compliance with the groundwater sulfate standard at the focus area.

In addition to the microcosm study, field investigations have been ongoing in order to characterize site conditions in the area where the PRB is likely to be installed. Continued investigation and development of a PRB as a viable alternative will also require further bench-scale and/or pilot-scale study to evaluate feasibility, performance and design factors. Currently, it is envisioned that the results of the microcosm study will be used in the design of a pilot-scale PRB. The design of the pilot-scale study and installation will be completed no later than 6 months from the date of this letter.

If you have any questions or concerns regarding this matter, please contact me.

Sincerely,



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